

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents
United States Patent and Trademark
Office
Box PCT
Washington, D.C. 20231
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year)
02 August 2000 (02.08.00)

International application No.
PCT/EP99/09794

Applicant's or agent's file reference
TS 9183 PCT

International filing date (day/month/year)
08 December 1999 (08.12.99)

Priority date (day/month/year)
09 December 1998 (09.12.98)

Applicant

EDMONDSON, Jon, Bert

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
30 June 2000 (30.06.00)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO
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1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

S. Mafla

Telephone No.: (41-22) 338.83.38

EP9909794

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT


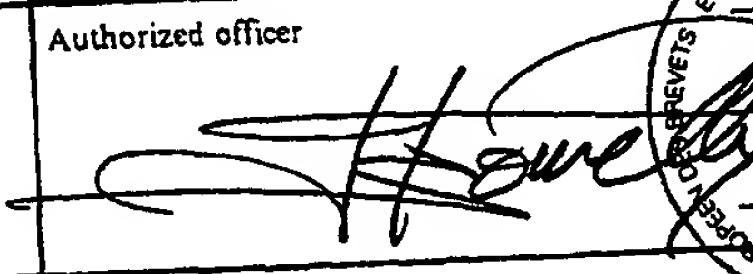
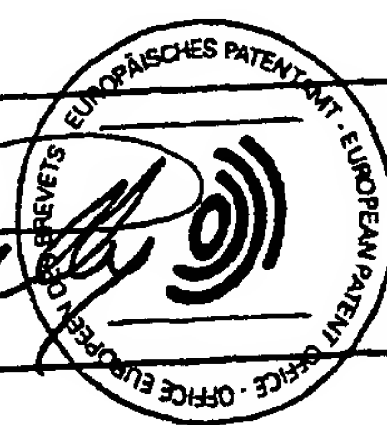
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference TS 9183 PCT	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP 99/ 09794	International filing date (day;month;year) 08/12/1999	Priority date (day;month;year) 09/12/1998
International Patent Classification (IPC) or national classification and IPC G08G1/0967		
Applicant SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 3 sheets, including this cover sheet.
- ☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).
- These annexes consists of a total of 12 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 30/06/2000	Date of completion of this report 18.12.00
Name and mailing address of the IPEA.  European Patent Office D-80298 Munich Tel. (+49-89) 2399-0, Tx: 523656 epmu d Fax: (+49-89) 2399-4465	Authorized officer  

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

Intern. application No.
PCT/EP99/09794

I. Basis of the report

1. This report has been drawn up on the basis of (Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.):

☐ the international application as originally filed.

☒ the description, pages 6, 9, 10 _____, as originally filed,
pages _____, filed with the demand,
pages 1-5, 5a, 7, 8, 8a _____, filed with the letter of 30/10/00,
pages _____, filed with the letter of _____.

☒ the claims, Nos. _____, as originally filed,
Nos. _____, as amended under Article 19,
Nos. _____, filed with the demand,
Nos. 1-8 _____, filed with the letter of 30/10/00,
Nos. _____, filed with the letter of _____.

☒ the drawings, sheets/fig _____, as originally filed,
sheets/fig _____, filed with the demand,
sheets/fig 1/1 _____, filed with the letter of 22/11/00,
sheets/fig _____, filed with the letter of _____.

2. The amendments have resulted in the cancellation of:

☐ the description, pages _____,
☐ the claims, Nos. _____,
☐ the drawings, sheets/fig _____.

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

Intern. application No.

PCT/EP99/09794

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement

1. STATEMENT

Novelty (N)	Claims 1-8	YES
	Claims	NO
Inventive Step (IS)	Claims 1-8	YES
	Claims	NO
Industrial Applicability (IA)	Claims 1-8	YES
	Claims	NO

2. CITATIONS AND EXPLANATIONS

From the explanations given by the Applicant in its reply about the closest prior art (WO 95/01607 acknowledged in the introductory portion of the description) with respect to the invention as claimed, it results that the subject-matter of new set of claims filed on 30/10/00 is considered to meet the requirements of articles 33 (2) and 33 (3) PCT.

TRANSPONDER COMMUNICATIONS SYSTEM

5 This invention relates to a unit for providing messages emanating from a remote station to a user. The unit can be carried in a vehicle or it can be carried by the user. The communication is wireless, that is by a mode that requires no tangible communication circuit between the fixed and mobile stations.

10 International patent application publication No. 95/01 607 discloses a unit for providing messages emanating from a remote station to a user, comprising a transponder section for communicating with the remote station by a wireless mode of communication, and a data processing section, wherein the transponder section includes means for storing an identification code, means that are responsive to an interrogation signal from the remote station to emit an identification signal bearing the identification code, means that are responsive to incoming data signals including an address code, which may be the same as or derived from the identification code, and means for providing the incoming data to the data processing section, and wherein the data processing section includes means for providing an audio and/or visual output for the user of the unit.

25 In International patent application publication No. 98/25 248 a radio frequency identification system is described that is applied to a vehicle in which there is an on-board computer system for monitoring and reporting parameters relating to various engine functions in combination with radio frequency identification transponder circuitry linked to the computer by a serial bus. The radio frequency identification system communicates with a fixed interrogator over a radio link.

30

5 The radio frequency identification circuit has a unique identification code. In response to a signal from the interrogator the radio frequency identification circuit responds by identifying itself and parameter data is sent to the interrogator through the radio frequency identification transponder.

10 International patent application publication No. 98/05 171 describes a radio frequency identification device with adjustable receiver sensitivity. It discloses the implementation of this type of device in a compact form, such as in an identification card, using a thin profile button-type battery. USA patent specification No. 5 448 110 also addresses the problems of fabricating a compact radio frequency identification transceiver
15 assembly in a low profile, flat, form. It discloses the possibility of transferring into an internal memory data received from a remote external interrogator and transmitting data stored in the internal memory.

20 The present invention is concerned with apparatus in a vehicle which enables information or entertainment and messages in general to be provided to the driver or other occupants of the vehicle.

25 The invention has been developed in connection with particular circumstances in which communications with the interior of the vehicle is difficult, for example in a car wash where the car radio aerial is retracted, the car is closed up. It is difficult to reliably supply information or entertainment at this point. The other circumstance is where the ignition is switched off leaving the car radio
30 inoperative.

It is an object of the present invention to provide a unit that allows making audio messages available through audio equipment installed in the vehicle.

35 According to the present invention there is provided a unit for providing messages emanating from a remote

station to a user, comprising a transponder section for communicating with the remote station by a wireless mode of communication, and a data processing section, wherein the transponder section includes means for storing an
5 identification code, means that are responsive to an interrogation signal from the remote station to emit an identification signal bearing the identification code, means that are responsive to incoming data signals including an address code, which may be the same as or
10 derived from the identification code, and means for providing the incoming data to the data processing section, and wherein the data processing section includes means for providing an audio and/or visual output for the user of the unit, characterized in that the unit further
15 comprises means responsive to the audio output to generate a modulated signal for emitting externally of the unit.

Another circumstance is where the ignition is switched off leaving the car radio inoperative and the electrical system of the vehicle is dead. Therefore a further object
20 of the present invention is to provide a self-contained unit.

To this end the present invention provides a unit for providing messages emanating from a remote station to a user, comprising a transponder section for communicating
25 with the remote station by a wireless mode of communication, and a data processing section, wherein the transponder section includes means for storing an identification code, means that are responsive to an interrogation signal from the remote station to emit an
30 identification signal bearing the identification code, means that are responsive to incoming data signals including an address code, which may be the same as or derived from the identification code, and means for providing the incoming data to the data processing
35 section, and wherein the data processing section includes

means for providing an audio and/or visual output for the user of the unit, characterized in that the unit is contained within a housing including one or more batteries for powering the transponder section and the data processing section.

5 The invention will now be described in more detail with reference to the accompanying drawings, wherein

Figure 1 is a block diagram of a system incorporating a unit in accord with the invention; and

10 Figures 2A, 2B and 2C show diagrams of modifications to the processing section of the unit of Figure 1.

The embodiment of the invention illustrated in Figure 1 will be described in the context of a unit intended to be mounted in a vehicle, and more particularly within the saloon of the vehicle, to provide messages of various kinds to the driver or other occupant of the vehicle. The wireless mode of communication assumed for purposes of illustration is a radio link which may be one using spread spectrum techniques to enhance security and the selective communication of the fixed or remote station with a desired vehicle unit. Wireless links include, in addition to radio, magnetic induction, sound waves, particularly ultrasonic, and optical, e.g. infra-red. The radio communication between the fixed station and the vehicle unit in the system to be described, uses very low power. In many countries frequency bands are assigned for low power, short range, communication without the necessity of licensing.

25 The circuit to be described is constructed as a self-contained unit 1. The unit 1 is located within a housing or case adapted to be mounted or attached at a suitable location within the vehicle. The unit 1 can be broadly considered in two parts, a transponder section 10 for communicating with a remote station 2 and a data processing section 30 for providing an audio output to the

30

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vehicle occupant. The remote station 2 radiates radio signals through antenna 3 and may be linked as at 4 to a central network. The unit 1 is intended to provide audio and/or visual information or entertainment or messages in general to the driver or other vehicle occupants. The description that follows will initially concentrate on an audio output. The transponder section 10 communicates with the remote station 2 by a radio link.

The transponder section 10 includes a receiver/transmitter unit 12 providing a transceiver facility for receiving and transmitting radio signals through an antenna 14 contained within the housing. A transponder microprocessor 16 has associated with it a memory 18 storing an identification code, specific to the transponder section 10, permanently resident in a section 19 of memory 18. The transfer of data between the unit 1 and the remote station 2 may be accomplished using a packet mode of transmission.

The transponder microprocessor 16 implements the program routines controlling the transponder section 10. These routines may be stored in memory 18 or elsewhere. The memory 18 may be on-chip or separate from the transponder microprocessor 16.

The transponder section 10 also has a data port 20, e.g. a serial port, through which data is sent to the processing section 30. As will be described later the data communication through the data port 20 may be made bi-directional to add interactive facilities for the user. The unit 1 is self-powered so that it includes at least one battery 22 and 39 for powering the transponder and processing sections 10 and 30. The battery requirements are discussed further below. As illustrated the transponder section 10 has its own battery 22.

In operation, when it is in range the transponder section 10 responds to an interrogation signal from remote

station 2 that is sent continuously or at regular intervals. The interrogation signal is recognised by the transponder microprocessor 16 and it responds by causing

incoming data will be in the form of compressed data files, so that memory space (random access memory, or RAM) will be required in any event in connection with the expansion and decoding of the compressed data files. The data stream may also need decryption where data is sent from the remote station in an encrypted form. This process may be implemented to allow playing of portions of the audio or video message while the remainder is still being decoded. The illustrated processing section 30 contains its own battery 39 which has to be of sufficient capacity to power the audio output stage 34 to drive a small speaker 36. It will be appreciated that since the transponder section 10 and the processing section 30 are intended to be parts of a single unit 1, a single battery may be used to power both sections 10 and 30.

To exemplify one use of the unit 1 described thus far, it can be used to provide information or music within a vehicle going through a car wash. A remote station 2 in the form of a fixed interrogator unit can be mounted adjacent the entry to the car wash to activate and identify the unit 1, and to address a data stream to it. This data stream can be decoded immediately to play the message or music while the vehicle is going through the car wash. Another possibility is to load the data stream elsewhere in a service station so that it is available should the vehicle then enter the car wash facility. The data stream is stored in memory and a trigger signal is provided on entering the car wash to cause the message/music to be played. In this case a remote station may be located at the entry to the car wash to transmit an appropriate trigger signal recognised by the transponder section 10 to initiate playback of the stored message.

It will be realised that the above-described unit 1 is capable of providing the aural output for the vehicle occupant even in circumstances where the ignition is

turned off and the electrical system of the vehicle is dead. Even if the electrical power is available within the vehicle, the self-contained nature of the unit 1 means that it functions without reliance on other electrical equipment within the vehicle together with any special provision that may need to be made to link the unit 1 to other electrically-powered equipment. An advantage of such a unit is that it can be used both inside a vehicle as well as outside the vehicle. The inter-activity with the user then can include providing information on the position, making notes, making hotel reservations.

However, it is envisaged that for audio messages, advantage could be taken of audio equipment installed in the vehicle. Figure 2A shows that the unit 1 further comprises means in the form of a very low power frequency modulation or FM transmitter 40 which is responsive to the output of the processing microprocessor 32. The means 40 generate a modulated signal 41 for emitting externally of the unit 1.

Figures 2B and 2C also indicate other modifications. Figure 2B shows the possibility of using a visual display arrangement 42 within the unit 1, such as one using a liquid crystal display mounted to a wall of the housing to display visual messages externally of the housing. This could be done in addition to or instead of the audio message output described above.

Another development is to provide some inter-activity from within the vehicle; for example by selection of options presented to the occupant. People are used to exercising options via key-pad operated devices. Figure 2C shows a modification in which the processing microprocessor 32 provides an output to the user via an output device generally indicated as 44 (this may be audio and/or visual) and there is provided an input port

or interface 46 within processing section 30 which is
connected to

A M E N D E D C L A I M S

1. A unit (1) for providing messages emanating from a remote station (2) to a user, comprising a transponder section (10) for communicating with the remote station (2) by a wireless mode of communication, and a data processing section (30), wherein the transponder section (10) includes means (19) for storing an identification code, means (16) that are responsive to an interrogation signal from the remote station (2) to emit an identification signal bearing the identification code, means (16) that are responsive to incoming data signals including an address code, which may be the same as or derived from the identification code, and means (20) for providing the incoming data to the data processing section (30), and wherein the data processing section (30) includes means for providing an audio and/or visual output for the user of the unit (1), characterized in that the unit (1) further comprises means (40) responsive to the audio output to generate a modulated signal (41) for emitting externally of the unit (1).
2. The unit according to claim 1, wherein the unit (1) is contained within a housing including one or more batteries (22, 39) for powering the transponder section (10) and the data processing section (30).
3. A unit (1) for providing messages emanating from a remote station (2) to a user, comprising a transponder section (10) for communicating with the remote station (2) by a wireless mode of communication, and a data processing section (30), wherein the transponder section (10) includes means (19) for storing an identification code, means (16) that are responsive to an interrogation signal from the remote station (2) to emit an identification

signal bearing the identification code, means (16) that
are responsive to incoming data signals including an
address code, which may be the same as or derived from the
identification code, and means (20) for providing the
5 incoming data to the data processing section (30), and
wherein the data processing section (30) includes means
for providing an audio and/or visual output for the user
of the unit (1), characterized in that the unit (1) is
contained within a housing including one or more
10 batteries (22, 39) for powering the transponder section
(10) and the data processing section (30).
4. The unit according to claim 3, wherein the unit (1)
further comprises means (40) responsive to the audio
output to generate a modulated signal (41) for emitting
15 externally of the unit (1).
5. The unit according to any one of the preceding claims,
wherein the means for providing an audio and/or visual
output at least includes means (36) for providing an aural
output.
20 6. The unit according to any one of the preceding claims
including means (46) for receiving an input from a user
and to initiate a signal from the transponder section (10)
for communicating the user input to the remote
station (2).
25 7. The unit according to claim 6 further comprising a
keypad or keyboard (48) for generating the user input.
8. The unit according to any one of the preceding claims
further comprising means for linking it to an external
device, which external device is operable by the user to
30 generate inputs to the unit (1).

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INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference TS 9183 PCT	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/EP 99/ 09794	International filing date (day/month/year) 08/12/1999	(Earliest) Priority Date (day/month/year) 09/12/1998
Applicant SHELL INTERNATIONALE RESEARCH ..et al		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.



It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.



the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :



contained in the international application in written form.



filed together with the international application in computer readable form.



furnished subsequently to this Authority in written form.



furnished subsequently to this Authority in computer readable form.



the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.



the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

the text is approved as submitted by the applicant.



the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

the text is approved as submitted by the applicant.



the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No. 1



as suggested by the applicant.



because the applicant failed to suggest a figure.



because this figure better characterizes the invention.



None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 99/09794

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G08G1/0967 G06K7/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G08G G06K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 95 01607 A (TSAKANIKAS PETER JAMES ; JAMES ROBERT D (US)) 12 January 1995 (1995-01-12) page 4, line 6 -page 15, line 34; figures 1-7	1-8
A	WO 98 25248 A (MICRON COMMUNICATIONS INC ; TUTTLE JOHN R (US)) 11 June 1998 (1998-06-11) cited in the application page 7, line 22 -page 11, line 4; figures 1-4	1,2
A	US 5 748 106 A (SCHOENIAN RICHARD J ET AL) 5 May 1998 (1998-05-05) the whole document	1-3

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

4 May 2000

Date of mailing of the international search report

12/05/2000

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Authorized officer

Degraeve, A

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 99/09794

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 644 515 A (TEXAS INSTRUMENTS DEUTSCHLAND) 22 March 1995 (1995-03-22) abstract; figure 1 -----	1-3

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 99/09794

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9501607 A	12-01-1995	US 5420794 A AU 7106694 A EP 0683911 A	30-05-1995 24-01-1995 29-11-1995
WO 9825248 A	11-06-1998	US 5995898 A AU 5375398 A EP 0941532 A	30-11-1999 29-06-1998 15-09-1999
US 5748106 A	05-05-1998	NONE	
EP 0644515 A	22-03-1995	AT 176544 T DE 69323424 D DE 69323424 T	15-02-1999 18-03-1999 17-06-1999

PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁷ :
G08G 1/0967, G06K 7/10

A1

(11) International Publication Number:

WO 00/34931

(43) International Publication Date:

15 June 2000 (15.06.00)

(21) International Application Number: PCT/EP99/09794

(22) International Filing Date: 8 December 1999 (08.12.99)

(30) Priority Data:
98310082.7 9 December 1998 (09.12.98) EP

(71) Applicant (for all designated States except US): SHELL
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(72) Inventor; and

(75) Inventor/Applicant (for US only): EDMONDSON, Jon, Bert
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SE1 7NA (GB).

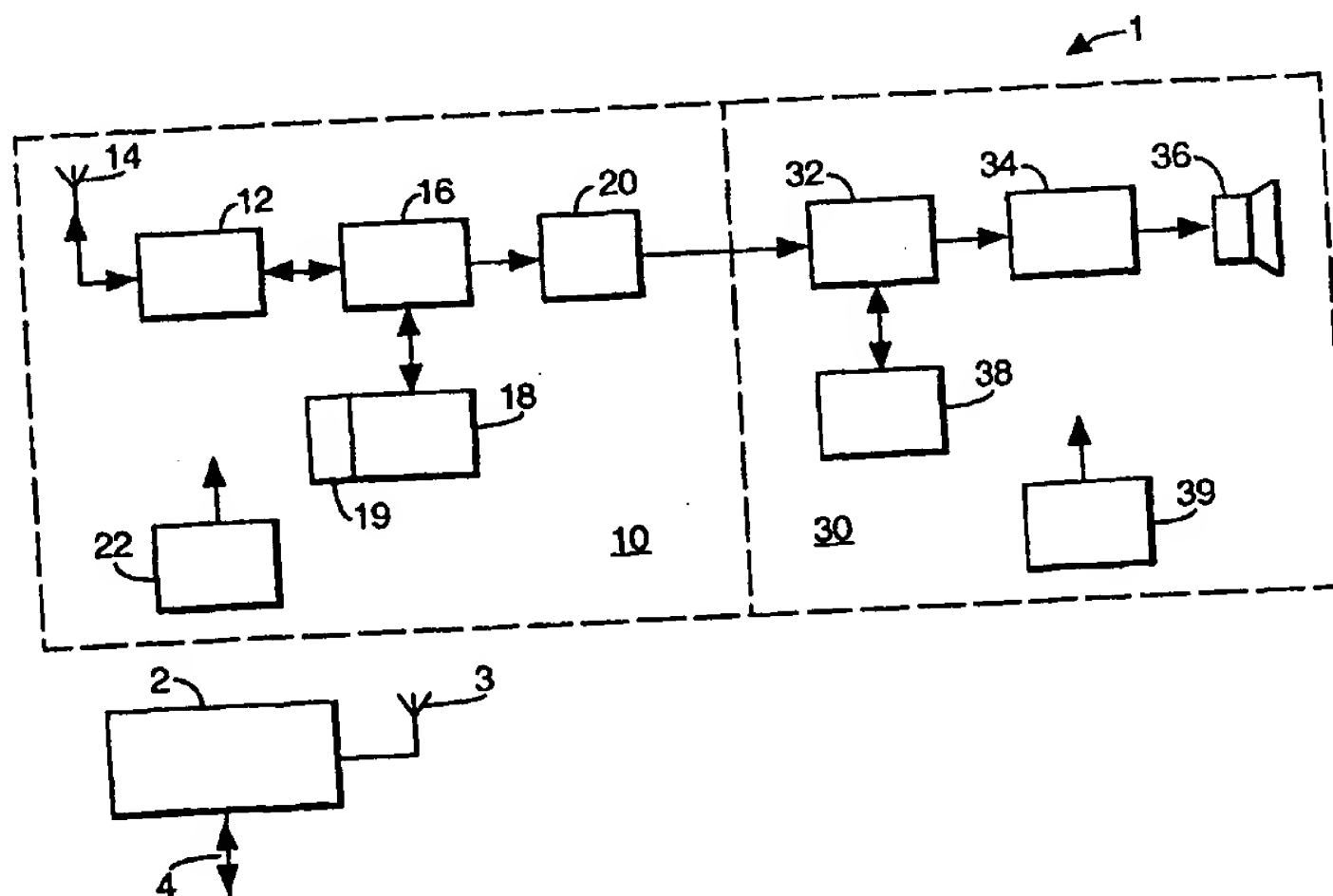
(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG,
BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE,
ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP,
KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA,
MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU,
SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG,
US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE,
LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM,
AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT,
BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU,
MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM,
GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published

With international search report.

Before the expiration of the time limit for amending the
claims and to be republished in the event of the receipt of
amendments.

(54) Title: TRANSPONDER COMMUNICATIONS SYSTEM



(57) Abstract

A unit (1) for use in a vehicle is interrogated and identified by a fixed interrogator (2). A wireless form of communication is established between the unit (1) and interrogator (2) to permit transfer of data to the unit (1). As well as appropriate communication circuitry (12) and an identification store (19), the unit (1) includes processing of the incoming data by a microprocessor (32) to provide an audio signal for energising a loud speaker (36) in the unit (1) to provide a sound output for the vehicle occupants. The unit is powered by internal batteries (22, 38) to be usable even when the vehicle ignition is turned off. The unit (1) is made self-contained to be mounted wherever convenient. The principle can be extended to providing data to control a visual display in the unit (1). The unit (1) may be provided with a user-interactive input such as a keypad (48). A radio link is described but other wireless means of communication are feasible.

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TRANSPONDER COMMUNICATIONS SYSTEM

This invention relates to a unit for providing messages emanating from a remote station to a user. The unit can be carried in a vehicle or it can be carried by the user. The communication is wireless, that is by a mode that requires no tangible communication circuit between the fixed and mobile stations.

International patent application publication No. 95/01 607 discloses A unit for providing messages emanating from a remote station to a user, comprising a transponder section for communicating with the remote station by a wireless mode of communication, and a data processing section, wherein the transponder section includes means for storing an identification code, means that are responsive to an interrogation signal from the remote station to emit an identification signal bearing the identification code, means that are responsive to incoming data signals including an address code, which may be the same as or derived from the identification code, and means for providing the incoming data to the data processing section, and wherein the data processing section includes means for providing an audio and/or visual output for the user of the unit.

In International patent application publication No. 98/25 248 a radio frequency identification system is described that is applied to a vehicle in which there is an on-board computer system for monitoring and reporting parameters relating to various engine functions in combination with radio frequency identification transponder circuitry linked to the computer by a serial bus. The radio frequency identification system communicates with a fixed interrogator over a radio link.

- 2 -

The radio frequency identification circuit has a unique identification code. In response to a signal from the interrogator the radio frequency identification circuit responds by identifying itself and parameter data is sent to the interrogator through the radio frequency identification transponder.

International patent application publication No. 98/05 171 describes a radio frequency identification device with adjustable receiver sensitivity. It discloses the implementation of this type of device in a compact form, such as in an identification card, using a thin profile button-type battery. USA patent specification No. 5 448 110 also addresses the problems of fabricating a compact radio frequency identification transceiver assembly in a low profile, flat, form. It discloses the possibility of transferring into an internal memory data received from a remote external interrogator and transmitting data stored in the internal memory.

The present invention is concerned with apparatus in a vehicle which enables information or entertainment and messages in general to be provided to the driver or other occupants of the vehicle.

The invention has been developed in connection with particular circumstances in which communications with the interior of the vehicle is difficult, for example in a car wash where the car radio aerial is retracted, the car is closed up. It is difficult to reliably supply information or entertainment at this point. The other circumstance is where the ignition is switched off leaving the car radio inoperative.

According to the present invention there is provided a unit for providing messages emanating from a remote station to a user, comprising a transponder section for communicating with the remote station by a wireless mode of communication, and a data processing section, wherein

- 3 -

the transponder section includes means for storing an identification code, means that are responsive to an interrogation signal from the remote station to emit an identification signal bearing the identification code, means that are responsive to incoming data signals including an address code, which may be the same as or derived from the identification code, and means for providing the incoming data to the data processing section, and wherein the data processing section includes means for providing an audio and/or visual output for the user of the unit, wherein the unit further comprises means responsive to the audio output to generate a modulated signal for emitting externally of the unit.

Another circumstance is where the ignition is switched off leaving the car radio inoperative and the electrical system of the vehicle is dead. Therefore a further object of the present invention is to provide a self-contained unit.

To this end the present invention provides a unit for providing messages emanating from a remote station to a user, comprising a transponder section for communicating with the remote station by a wireless mode of communication, and a data processing section, wherein the transponder section includes means for storing an identification code, means that are responsive to an interrogation signal from the remote station to emit an identification signal bearing the identification code, means that are responsive to incoming data signals including an address code, which may be the same as or derived from the identification code, and means for providing the incoming data to the data processing section, and wherein the data processing section includes means for providing an audio and/or visual output for the user of the unit, wherein the unit is contained within a

- 4 -

housing including one or more batteries for powering the transponder section and the data processing section.

The invention will now be described in more detail with reference to the accompanying drawings, wherein

5 Figure 1 is a block diagram of a system incorporating a unit in accord with the invention; and

Figures 2A, 2B and 2C show diagrams of modifications to the processing section of the unit of Figure 1.

10 The embodiment of the invention illustrated in Figure 1 will be described in the context of a unit intended to be mounted in a vehicle, and more particularly within the saloon of the vehicle, to provide messages of various kinds to the driver or other occupant of the vehicle. The wireless mode of communication assumed for
15 purposes of illustration is a radio link which may be one using spread spectrum techniques to enhance security and the selective communication of the fixed or remote station with a desired vehicle unit. Wireless links include, in addition to radio, magnetic induction, sound waves,
20 particularly ultrasonic, and optical, e.g. infra-red. The radio communication between the fixed station and the vehicle unit in the system to be described, uses very low power. In many countries frequency bands are assigned for low power, short range, communication without the
25 necessity of licensing.

The circuit to be described is constructed as a self-contained unit 1. The unit 1 is located within a housing or case adapted to be mounted or attached at a suitable location within the vehicle. The unit 1 can be broadly
30 considered in two parts, a transponder section 10 for communicating with a remote station 2 and a data processing section 30 for providing an audio output to the vehicle occupant. The remote station 2 radiates radio signals through antenna 3 and may be linked as at 4 to a
35 central network. The unit 1 is intended to provide audio

- 5 -

and/or visual information or entertainment or messages in general to the driver or other vehicle occupants. The description that follows will initially concentrate on an audio output. The transponder section 10 communicates with the remote station 2 by a radio link.

5 The transponder section 10 includes a receiver/transmitter unit 12 providing a transceive facility for receiving and transmitting radio signals through an antenna 14 contained within the housing. A transponder
10 microprocessor 16 has associated with it a memory 18 storing an identification code, specific to the transponder section 10, permanently resident in a section 19 of memory 18. The transfer of data between the unit 1 and the remote station 2 may be accomplished using
15 a packet mode of transmission.

The transponder microprocessor 16 implements the program routines controlling the transponder section 10. These routines may be stored in memory 18 or elsewhere. The memory 18 may be on-chip or separate from the
20 transponder microprocessor 16.

The transponder section 10 also has a data port 20, e.g. a serial port, through which data is sent to the processing section 30. As will be described later the data communication through the data port 20 may be made bi-
25 directional to add interactive facilities for the user. The unit 1 is self-powered so that it includes at least one battery 22 and 38 for powering the transponder and processing sections 10 and 30. The battery requirements are discussed further below. As illustrated the
30 transponder section 10 has its own battery 22.

In operation, when it is in range the transponder section 10 responds to an interrogation signal from remote station 2 that is sent continuously or at regular intervals. The interrogation signal is recognized by the
35 transponder microprocessor 16 and it responds by causing

- 6 -

the identification code in section 19 of memory 18 to be sent to the remote station 2 where it is stored to enable subsequent selective addressing of the transponder section 10. The address code may be the identification code or a code derived from it, i.e. part of the identification code, or it may be a code established at the time by the remote station 2 and stored in memory 18 for enabling transactions to be selectively established with unit 1. By this means data signals can be specifically directed to a given vehicle, even if other vehicles are within range. The nature and purpose of the data is discussed further below. The data addressed to unit 1 is extracted and formatted into a data stream by the transponder microprocessor 16 and sent to the processing section 30 through the data port 20.

The processing section 30 is designed to use the incoming data to provide an audio signal may be used to provide an eventual external aural or audible signal (Figure 2A) or it may be used directly in the unit 1 to provide a sound output within the vehicle for the driver or other occupants. In processing section 30 the processing is controlled and the data are decoded by a processing microprocessor 32. The processing microprocessor 32 receives a stream of serial data through the data port 20. This data is to be decoded to an audio signal, e.g. an announcement or music, which is output to an audio output stage 34 driving a speaker 36 which is contained within the housing of unit 1 with appropriate provision for emitting the sound output. Under some circumstances it may be desired that the delivery of the audio signal is not to be done immediately as the data stream arrives but is to be triggered at a later time. The processing microprocessor 32 has associated with it an extended memory 38 in which the data stream can be stored until required for decoding. It is contemplated that the

- 7 -

incoming data will be in the form of compressed data files, so that memory space (random access memory, or RAM) will be required in any event in connection with the expansion and decoding of the compressed data files. The data stream may also need decryption where data is sent from the remote station in an encrypted form. This process may be implemented to allow playing of portions of the audio or video message while the remainder is still being decoded. The illustrated processing section 30 contains its own battery 38 which has to be of sufficient capacity to power the audio output stage 34 to drive a small speaker 36. It will be appreciated that since the transponder section 10 and the processing section 30 are intended to be parts of a single unit 1, a single battery may be used to power both sections 10 and 30.

To exemplify one use of the unit 1 described thus far, it can be used to provide information or music within a vehicle going through a car wash. A remote station 2 in the form of a fixed interrogator unit can be mounted adjacent the entry to the car wash to activate and identify the unit 1, and to address a data stream to it. This data stream can be decoded immediately to play the message or music while the vehicle is going through the car wash. Another possibility is to load the data stream elsewhere in a service station so that it is available should the vehicle then enter the car wash facility. The data stream is stored in memory and a trigger signal is provided on entering the car wash to cause the message/music to be played. In this case a remote station may be located at the entry to the car wash to transmit an appropriate trigger signal recognised by the transponder section 10 to initiate playback of the stored message.

It will be realised that the above-described unit 1 is capable of providing the aural output for the vehicle occupant even in circumstances where the ignition is

turned off and the electrical system of the vehicle is dead. Even if the electrical power is available within the vehicle, the self-contained nature of the unit 1 means that it functions without reliance on other electrical equipment within the vehicle together with any special provision that may need to be made to link the unit 1 to other electrically-powered equipment. An advantage of such a unit is that it can be used both inside a vehicle as well as outside the vehicle. The interactivity with the user then can include providing information on the position, making notes, making hotel reservations.

However, it is envisaged that for audio messages, advantage could be taken of audio equipment installed in the vehicle. Figure 2A shows that the unit 1 further comprises means in the form of a very low power frequency modulation or FM transmitter 40 which is responsive to the output of the processing microprocessor 32. The means 40 generate 41 a modulated signal for emitting externally of the unit 1.

Figures 2B and 2C also indicate other modifications. Figure 2B shows the possibility of using a visual display arrangement 42 within the unit 1, such as one using a liquid crystal display mounted to a wall of the housing to display visual messages externally of the housing. This could be done in addition to or instead of the audio message output described above.

Another development is to provide some interactivity from within the vehicle; for example by selection of options presented to the occupant. People are used to exercising options via key-pad operated devices. Figure 2C shows a modification in which the processing microprocessor 32 provides an output to the user via an output device generally indicated as 44 (this may be audio and/or visual) and there is provided an input port or interface 46 within processing section 30 which is connected to

- 9 -

the processing microprocessor 32 and by means of which a user-operable input device, for example a key pad 48, is linked to provide input signals to the processing microprocessor 32. If the input device is a key-pad, while it may be incorporated in the unit 1, for convenience of use, it may be preferable to have the keypad 48 external to the unit 1 as shown. The connection to the unit 1 may be made by a link 50 such as a cable or by infra-red. However, the interactivity by the user could be provided by voice commands in which case it may be possible to mount a voice responsive component as a part of the unit 1.

In the illustrated case key actuation is recognized by the processing microprocessor 32 which generates a code corresponding to the actuated key. This code is returned to the transponder microprocessor 16 via the serial port 20. The transponder microprocessor 16 will then initiate a digitally coded signal for return to the remote station 2. The external action taken thereafter need not be restricted to providing information directly for the occupant. Data may be provided to other means within the unit 1 with, if desired, an acknowledgement for the occupant of the action taken. For example, it may be concerned with up-dating the sum available in a credit card memory connected to the transponder microprocessor 16.

Although the practice of the invention has been described in relation to a self-contained unit 1 for use within a vehicle, a wider utility is envisaged. For example, it could be used to call up commentaries or specific information directed to user in museums, galleries and the like. The user can selectively obtain the wanted information without affecting other users in the vicinity. In such a case any audio output may be better provided to the user by headphones plugged into a

- 10 -

socket on the housing of the unit 1. A headphone socket 40 is shown in Figure 1. It may be an alternative to the speaker 36 or arranged to cut out the speaker when the headphones are plugged in.

5 The unit which has been described, together with its various modifications has been discussed in terms of a transponder section providing the facilities to communicate on the one hand with a remote station, and on the other hand communicating internally with the processing section; and a processing section in data communication with the transponder section on the one hand and on the other hand providing the audio and/or visual communication within the user. It will be understood that in order to perform the functions described a practical unit 1 may use a single microprocessor to perform the functions of the transponder microprocessor 16 and the processing microprocessor 32 and a single block of addressable memory to perform the functions of memories 18 and 38. To enhance fabrication into a compact, integrated unit, a single battery would be preferable. The batteries used in the practice of the invention may be of a rechargeable kind.

25 Mention has been made above of sending data by means of compressed files. International patent application publication No. 98/23 039 describes concatenation compression for real-time voice and data processing. Another example of a compression technique for audio and data signals sent from one site to another is described in USA patent specification No. 5 742 773.

30 The remote station can not only be placed at a car wash station, it can also be placed on a forecourt of a refuelling station or at a gate or a drive-through window.

- 11 -

C L A I M S

1. A unit for providing messages emanating from a remote station to a user, comprising a transponder section for communicating with the remote station by a wireless mode of communication, and a data processing section, wherein the transponder section includes means for storing an identification code, means that are responsive to an interrogation signal from the remote station to emit an identification signal bearing the identification code, means that are responsive to incoming data signals including an address code, which may be the same as or derived from the identification code, and means for providing the incoming data to the data processing section, and wherein the data processing section includes means for providing an audio and/or visual output for the user of the unit, wherein the unit further comprises means responsive to the audio output to generate a modulated signal for emitting externally of the unit.
2. The unit according to claim 1, wherein the unit is contained within a housing including one or more batteries for powering the transponder section and the data processing section.
3. A unit for providing messages emanating from a remote station to a user, comprising a transponder section for communicating with the remote station by a wireless mode of communication, and a data processing section, wherein the transponder section includes means for storing an identification code, means that are responsive to an interrogation signal from the remote station to emit an identification signal bearing the identification code, means that are responsive to incoming data signals including an address code, which may be the same as or

- 12 -

derived from the identification code, and means for providing the incoming data to the data processing section, and wherein the data processing section includes means for providing an audio and/or visual output for the user of the unit, wherein the unit is contained within a housing including one or more batteries for powering the transponder section and the data processing section.

4. The unit according to claim 3, wherein the unit further comprises means responsive to the audio output to generate a modulated signal for emitting externally of the unit.

5. The unit according to any one of the preceding claims, wherein the means for providing an audio and/or visual output at least includes means for providing an aural output.

6. The unit according to any one of the preceding claims including means for receiving an input from a user and to initiate a signal from the transponder for communicating the user input to the remote station.

7. The unit according to claim 6 further comprising a keypad or keyboard for generating the user input.

8. The unit according to any one of the preceding claims further comprising means for linking it to an external device, which external device is operable by the user to generate inputs to the unit.

Fig.1.

1/1

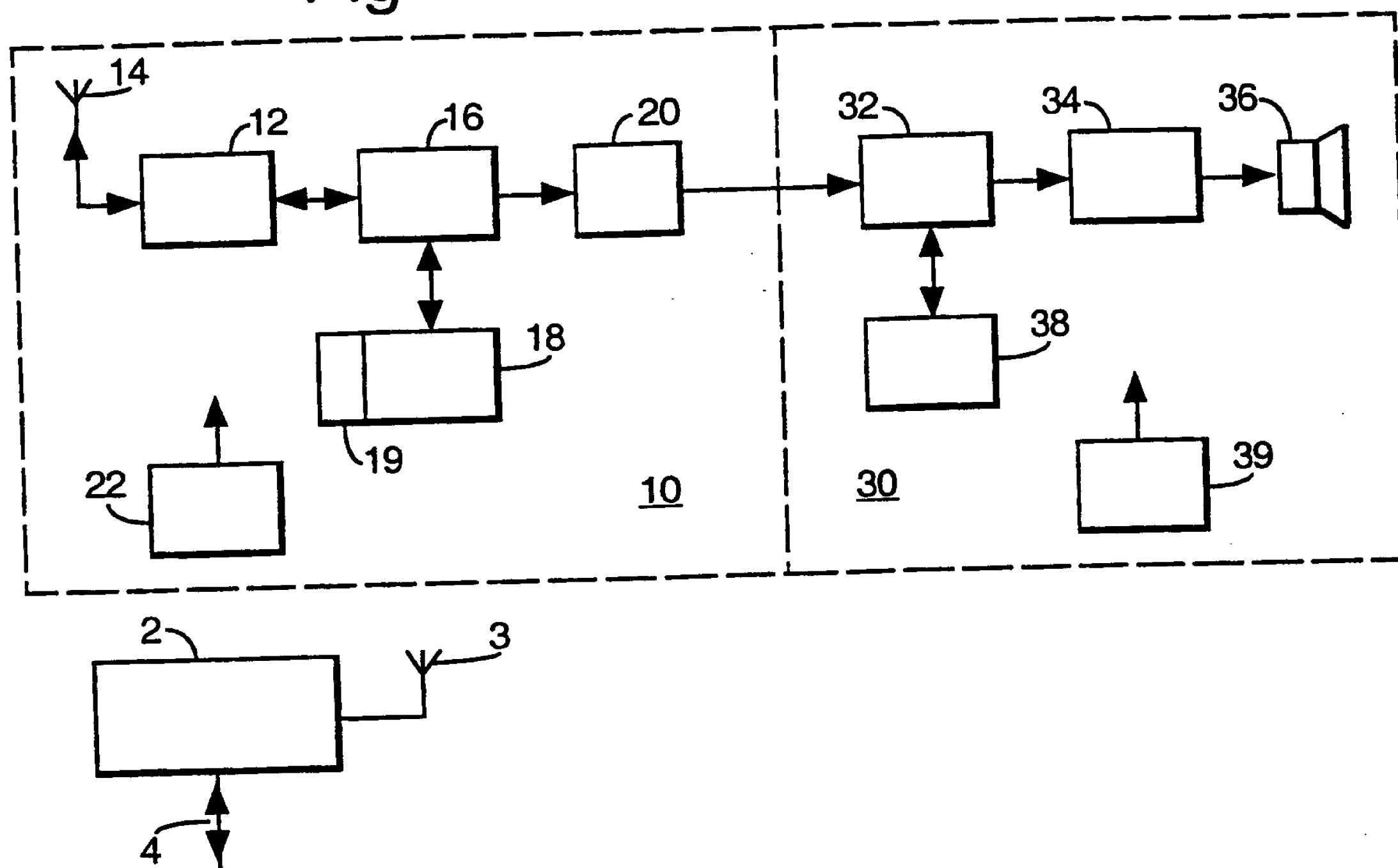


Fig.2A.

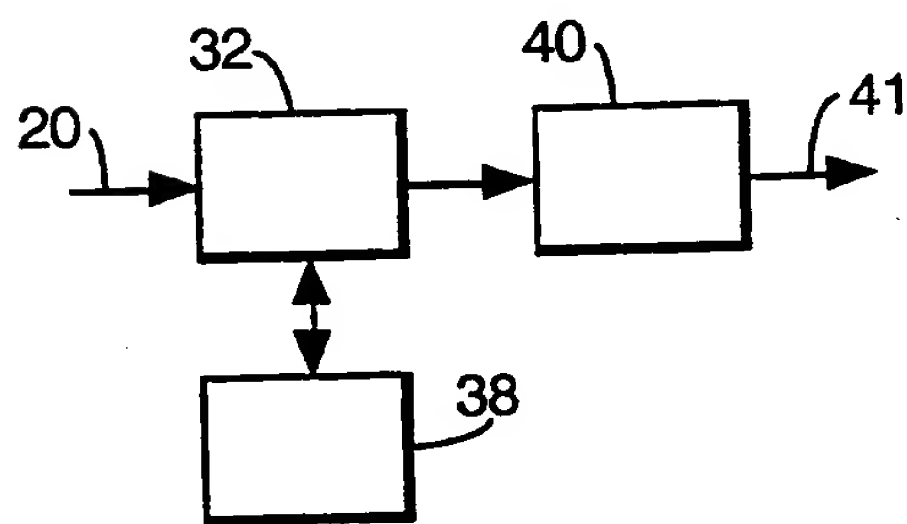


Fig.2B.

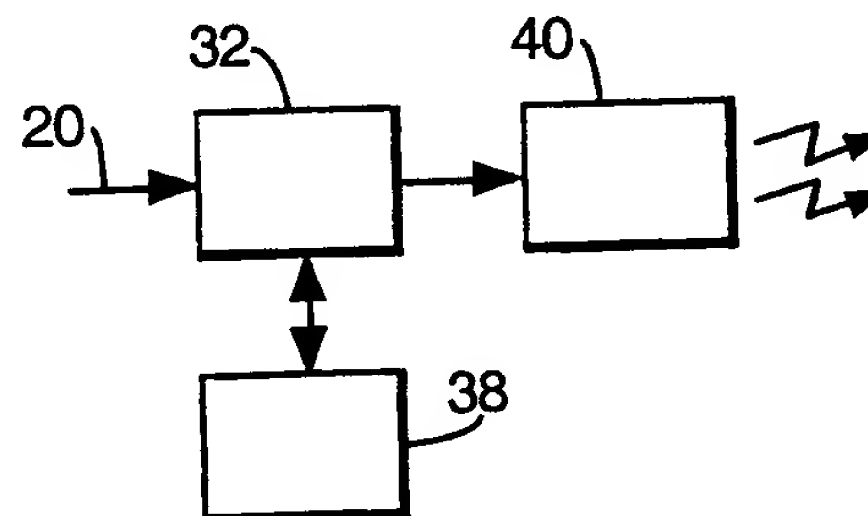
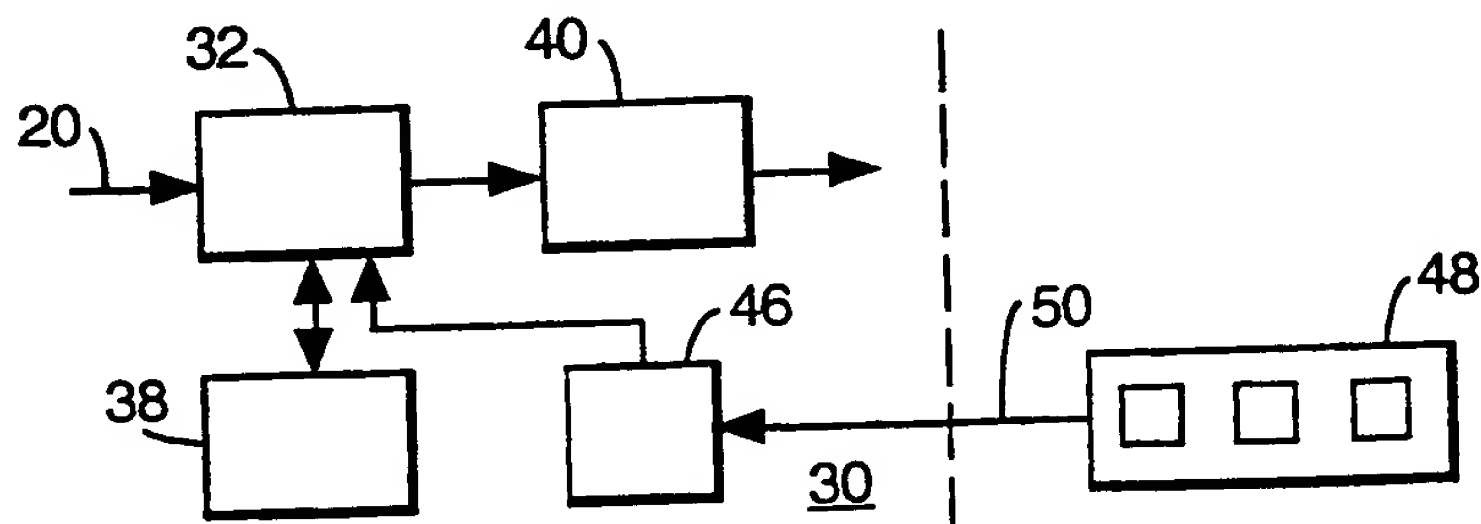


Fig.2C.



INTERNATIONAL SEARCH REPORT

Internat. Application No.
PCT/EP 99/09794

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G08G1/0967 G06K7/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G08G G06K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 95 01607 A (TSAKANIKAS PETER JAMES ; JAMES ROBERT D (US)) 12 January 1995 (1995-01-12) page 4, line 6 -page 15, line 34; figures 1-7	1-8
A	WO 98 25248 A (MICRON COMMUNICATIONS INC ; TUTTLE JOHN R (US)) 11 June 1998 (1998-06-11) cited in the application page 7, line 22 -page 11, line 4; figures 1-4	1,2
A	US 5 748 106 A (SCHOENIAN RICHARD J ET AL) 5 May 1998 (1998-05-05) the whole document	1-3

☒ Further documents are listed in the continuation of box C.

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- *E* earlier document but published on or after the international filing date
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- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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- *&* document member of the same patent family

Date of the actual completion of the international search

4 May 2000

Date of mailing of the international search report

12/05/2000

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INTERNATIONAL SEARCH REPORT

Internat. Application No.

PCT/EP 99/09794

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 644 515 A (TEXAS INSTRUMENTS DEUTSCHLAND) 22 March 1995 (1995-03-22) abstract; figure 1	1-3

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No.

PCT/EP 99/09794

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9501607	A	12-01-1995	US 5420794 A AU 7106694 A EP 0683911 A	30-05-1995 24-01-1995 29-11-1995
WO 9825248	A	11-06-1998	US 5995898 A AU 5375398 A EP 0941532 A	30-11-1999 29-06-1998 15-09-1999
US 5748106	A	05-05-1998	NONE	
EP 0644515	A	22-03-1995	AT 176544 T DE 69323424 D DE 69323424 T	15-02-1999 18-03-1999 17-06-1999

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PCT/EP 99/09794

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Date of mailing of the international search report

12/05/2000

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INTERNATIONAL SEARCH REPORT

Intern. Application No
PCT/EP 99/09794

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
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INTERNATIONAL SEARCH REPORT

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International Application No

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US 5748106 A	05-05-1998	NONE	
EP 0644515 A	22-03-1995	AT 176544 T DE 69323424 D DE 69323424 T	15-02-1999 18-03-1999 17-06-1999

TRANSPONDER COMMUNICATIONS SYSTEM

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10 International patent application publication No. 95/01 607 discloses a unit for providing messages emanating from a remote station to a user, comprising a transponder section for communicating with the remote station by a wireless mode of communication, and a data processing section, wherein the transponder section includes means
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25 In International patent application publication No. 98/25 248 a radio frequency identification system is described that is applied to a vehicle in which there is an on-board computer system for monitoring and reporting parameters relating to various engine functions in
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5 The radio frequency identification circuit has a unique identification code. In response to a signal from the interrogator the radio frequency identification circuit responds by identifying itself and parameter data is sent to the interrogator through the radio frequency identification transponder.

10 International patent application publication No. 98/05 171 describes a radio frequency identification device with adjustable receiver sensitivity. It discloses the implementation of this type of device in a compact form, such as in an identification card, using a thin profile button-type battery. USA patent specification No. 5 448 110 also addresses the problems of fabricating a compact radio frequency identification transceiver assembly in a low profile, flat, form. It discloses the possibility of transferring into an internal memory data received from a remote external interrogator and transmitting data stored in the internal memory.

15 The present invention is concerned with apparatus in a vehicle which enables information or entertainment and messages in general to be provided to the driver or other occupants of the vehicle.

20 The invention has been developed in connection with particular circumstances in which communications with the interior of the vehicle is difficult, for example in a car wash where the car radio aerial is retracted, the car is closed up. It is difficult to reliably supply information or entertainment at this point. The other circumstance is where the ignition is switched off leaving the car radio inoperative.

25 It is an object of the present invention to provide a unit that allows making audio messages available through audio equipment installed in the vehicle.

30 According to the present invention there is provided a unit for providing messages emanating from a remote

35

station to a user, comprising a transponder section for communicating with the remote station by a wireless mode of communication, and a data processing section, wherein the transponder section includes means for storing an
5 identification code, means that are responsive to an interrogation signal from the remote station to emit an identification signal bearing the identification code, means that are responsive to incoming data signals including an address code, which may be the same as or
10 derived from the identification code, and means for providing the incoming data to the data processing section, and wherein the data processing section includes means for providing an audio and/or visual output for the user of the unit, characterized in that the unit further
15 comprises means responsive to the audio output to generate a modulated signal for emitting externally of the unit.

Another circumstance is where the ignition is switched off leaving the car radio inoperative and the electrical system of the vehicle is dead. Therefore a further object
20 of the present invention is to provide a self-contained unit.

To this end the present invention provides a unit for providing messages emanating from a remote station to a user, comprising a transponder section for communicating
25 with the remote station by a wireless mode of communication, and a data processing section, wherein the transponder section includes means for storing an identification code, means that are responsive to an interrogation signal from the remote station to emit an
30 identification signal bearing the identification code, means that are responsive to incoming data signals including an address code, which may be the same as or derived from the identification code, and means for providing the incoming data to the data processing
35 section, and wherein the data processing section includes

means for providing an audio and/or visual output for the user of the unit, characterized in that the unit is contained within a housing including one or more batteries for powering the transponder section and the data processing section.

5 The invention will now be described in more detail with reference to the accompanying drawings, wherein

Figure 1 is a block diagram of a system incorporating a unit in accord with the invention; and

10 Figures 2A, 2B and 2C show diagrams of modifications to the processing section of the unit of Figure 1.

The embodiment of the invention illustrated in Figure 1 will be described in the context of a unit intended to be mounted in a vehicle, and more particularly within the saloon of the vehicle, to provide messages of various kinds to the driver or other occupant of the vehicle. The wireless mode of communication assumed for purposes of illustration is a radio link which may be one using spread spectrum techniques to enhance security and the selective communication of the fixed or remote station with a desired vehicle unit. Wireless links include, in addition to radio, magnetic induction, sound waves, particularly ultrasonic, and optical, e.g. infra-red. The radio communication between the fixed station and the vehicle unit in the system to be described, uses very low power. In many countries frequency bands are assigned for low power, short range, communication without the necessity of licensing.

25 The circuit to be described is constructed as a self-contained unit 1. The unit 1 is located within a housing or case adapted to be mounted or attached at a suitable location within the vehicle. The unit 1 can be broadly considered in two parts, a transponder section 10 for communicating with a remote station 2 and a data processing section 30 for providing an audio output to the

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vehicle occupant. The remote station 2 radiates radio signals through antenna 3 and may be linked as at 4 to a central network. The unit 1 is intended to provide audio and/or visual information or entertainment or messages in general to the driver or other vehicle occupants. The description that follows will initially concentrate on an audio output. The transponder section 10 communicates with the remote station 2 by a radio link.

The transponder section 10 includes a receiver/transmitter unit 12 providing a transceiver facility for receiving and transmitting radio signals through an antenna 14 contained within the housing. A transponder microprocessor 16 has associated with it a memory 18 storing an identification code, specific to the transponder section 10, permanently resident in a section 19 of memory 18. The transfer of data between the unit 1 and the remote station 2 may be accomplished using a packet mode of transmission.

The transponder microprocessor 16 implements the program routines controlling the transponder section 10. These routines may be stored in memory 18 or elsewhere. The memory 18 may be on-chip or separate from the transponder microprocessor 16.

The transponder section 10 also has a data port 20, e.g. a serial port, through which data is sent to the processing section 30. As will be described later the data communication through the data port 20 may be made bi-directional to add interactive facilities for the user. The unit 1 is self-powered so that it includes at least one battery 22 and 39 for powering the transponder and processing sections 10 and 30. The battery requirements are discussed further below. As illustrated the transponder section 10 has its own battery 22.

In operation, when it is in range the transponder section 10 responds to an interrogation signal from remote

station 2 that is sent continuously or at regular intervals. The interrogation signal is recognised by the transponder microprocessor 16 and it responds by causing the identification code in section 19 of memory 18 to be sent to the remote station 2 where it is stored to enable subsequent selective addressing of the transponder section 10. The address code may be the identification code or a code derived from it, i.e. part of the identification code, or it may be a code established at the time by the remote station 2 and stored in memory 18 for enabling transactions to be selectively established with unit 1. By this means data signals can be specifically directed to a given vehicle, even if other vehicles are within range. The nature and purpose of the data is discussed further below. The data addressed to unit 1 is extracted and formatted into a data stream by the transponder microprocessor 16 and sent to the processing section 30 through the data port 20.

The processing section 30 is designed to use the incoming data to provide an audio signal may be used to provide an eventual external aural or audible signal (Figure 2A) or it may be used directly in the unit 1 to provide a sound output within the vehicle for the driver or other occupants. In processing section 30 the processing is controlled and the data are decoded by a processing microprocessor 32. The processing microprocessor 32 receives a stream of serial data through the data port 20. This data is to be decoded to an audio signal, e.g. an announcement or music, which is output to an audio output stage 34 driving a speaker 36 which is contained within the housing of unit 1 with appropriate provision for emitting the sound output. Under some circumstances it may be desired that the delivery of the audio signal is not to be done immediately as the data stream arrives but is to be triggered at a later time. The

processing microprocessor 32 has associated with it an extended memory 38 in which the data stream can be stored until required for decoding. It is contemplated that the incoming data will be in the form of compressed data files, so that memory space (random access memory, or RAM) will be required in any event in connection with the expansion and decoding of the compressed data files. The data stream may also need decryption where data is sent from the remote station in an encrypted form. This process may be implemented to allow playing of portions of the audio or video message while the remainder is still being decoded. The illustrated processing section 30 contains its own battery 39 which has to be of sufficient capacity to power the audio output stage 34 to drive a small speaker 36. It will be appreciated that since the transponder section 10 and the processing section 30 are intended to be parts of a single unit 1, a single battery may be used to power both sections 10 and 30.

To exemplify one use of the unit 1 described thus far, it can be used to provide information or music within a vehicle going through a car wash. A remote station 2 in the form of a fixed interrogator unit can be mounted adjacent the entry to the car wash to activate and identify the unit 1, and to address a data stream to it. This data stream can be decoded immediately to play the message or music while the vehicle is going through the car wash. Another possibility is to load the data stream elsewhere in a service station so that it is available should the vehicle then enter the car wash facility. The data stream is stored in memory and a trigger signal is provided on entering the car wash to cause the message/music to be played. In this case a remote station may be located at the entry to the car wash to transmit an appropriate trigger signal recognised by the transponder section 10 to initiate playback of the stored message.

It will be realised that the above-described unit 1 is capable of providing the aural output for the vehicle occupant even in circumstances where the ignition is turned off and the electrical system of the vehicle is dead. Even if the electrical power is available within the vehicle, the self-contained nature of the unit 1 means that it functions without reliance on other electrical equipment within the vehicle together with any special provision that may need to be made to link the unit 1 to other electrically-powered equipment. An advantage of such a unit is that it can be used both inside a vehicle as well as outside the vehicle. The inter-activity with the user then can include providing information on the position, making notes, making hotel reservations.

However, it is envisaged that for audio messages, advantage could be taken of audio equipment installed in the vehicle. Figure 2A shows that the unit 1 further comprises means in the form of a very low power frequency modulation or FM transmitter 40 which is responsive to the output of the processing microprocessor 32. The means 40 generate a modulated signal 41 for emitting externally of the unit 1.

Figures 2B and 2C also indicate other modifications. Figure 2B shows the possibility of using a visual display arrangement 42 within the unit 1, such as one using a liquid crystal display mounted to a wall of the housing to display visual messages externally of the housing. This could be done in addition to or instead of the audio message output described above.

Another development is to provide some inter-activity from within the vehicle; for example by selection of options presented to the occupant. People are used to exercising options via key-pad operated devices. Figure 2C shows a modification in which the processing microprocessor 32 provides an output to the user via an

output device generally indicated as 44 (this may be audio and/or visual) and there is provided an input port or interface 46 within processing section 30 which is connected to the processing microprocessor 32 and by means of which a user-operable input device, for example a key pad 48, is linked to provide input signals to the processing microprocessor 32. If the input device is a key-pad, while it may be incorporated in the unit 1, for convenience of use, it may be preferable to have the keypad 48 external to the unit 1 as shown. The connection to the unit 1 may be made by a link 50 such as a cable or by infra-red. However, the interactivity by the user could be provided by voice commands in which case it may be possible to mount a voice responsive component as a part of the unit 1.

In the illustrated case key actuation is recognized by the processing microprocessor 32 which generates a code corresponding to the actuated key. This code is returned to the transponder microprocessor 16 via the serial port 20. The transponder microprocessor 16 will then initiate a digitally coded signal for return to the remote station 2. The external action taken thereafter need not be restricted to providing information directly for the occupant. Data may be provided to other means within the unit 1 with, if desired, an acknowledgement for the occupant of the action taken. For example, it may be concerned with up-dating the sum available in a credit card memory connected to the transponder microprocessor 16.

Although the practice of the invention has been described in relation to a self-contained unit 1 for use within a vehicle, a wider utility is envisaged. For example, it could be used to call up commentaries or specific information directed to user in museums, galleries and the like. The user can selectively obtain

the wanted information without affecting other users in the vicinity. In such a case any audio output may be better provided to the user by headphones plugged into a socket on the housing of the unit 1. A headphone socket 40 is shown in Figure 1. It may be an alternative to the speaker 36 or arranged to cut out the speaker when the headphones are plugged in.

The unit which has been described, together with its various modifications has been discussed in terms of a transponder section providing the facilities to communicate on the one hand with a remote station, and on the other hand communicating internally with the processing section; and a processing section in data communication with the transponder section on the one hand and on the other hand providing the audio and/or visual communication within the user. It will be understood that in order to perform the functions described a practical unit 1 may use a single microprocessor to perform the functions of the transponder microprocessor 16 and the processing microprocessor 32 and a single block of addressable memory to perform the functions of memories 18 and 38. To enhance fabrication into a compact, integrated unit, a single battery would be preferable. The batteries used in the practice of the invention may be of a rechargeable kind.

Mention has been made above of sending data by means of compressed files. International patent application publication No. 98/23 039 describes concatenation compression for real-time voice and data processing. Another example of a compression technique for audio and data signals sent from one site to another is described in USA patent specification No. 5 742 773.

The remote station can not only be placed at a car wash station, it can also be placed on a forecourt of a refuelling station or at a gate or a drive-through window.

A B S T R A C T

TRANSPONDER COMMUNICATIONS SYSTEM

A unit for use in a vehicle is interrogated and identified by a fixed interrogator. A wireless form of communication is established between the unit and interrogator to permit transfer of data to the unit. As well as appropriate communication circuitry and an identification store, the unit includes processing of the incoming data by a microprocessor to provide an audio signal for energising a loud speaker in the unit to provide a sound output for the vehicle occupants. The unit is powered by internal batteries to be usable even when the vehicle ignition is turned off. The unit is made self-contained to be mounted wherever convenient. The principle can be extended to providing data to control a visual display in the unit. The unit may be provided with a user-interactive input such as a keypad. A radio link is described but other wireless means of communication are feasible.